diurnal variation is not observable; (2) irregular variations are sometimes observed with an extremely small amplitude of 0.2 ppmv at most; (3) a seasonal variation with the minimum concentration in mid-April and the maximum concentration in mid-October and peak-to-peak amplitude of about 1.2 ppmv is detected; and (4) an annual mean value of CO_2 concentration is 342.6 ppmv.

The results obtained in 1985 are as follows: An annual mean value of CO_2 concentration is 343.8 ppmv. The pattern of seasonal variation is almost the same as that of the previous year. But a secular increase trend of the CO_2 content is larger than 1984.

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BALLOON MEASUREMENTS OF AEROSOLS IN THE ANTARCTIC STRATOSPHERE (III) (ABSTRACT)

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Balloon measurements of aerosols have been made in the winter and spring of 1985 to investigate the behavior of the antarctic stratospheric aerosols. Number concentration and the size distribution of aerosol particles with diameter greater than 0.3 μm were measured by using a light scattering aerosol particle counter. The vertical distributions of the number concentration were obtained up to about 18 km on July 21 and about 17 km on October 8, 1985. Compared with the result on June 3, 1983, the stratospheric aerosol concentration on July 21, 1985 decreased by a factor of three. This indicates that the higher aerosol concentration on June 3, 1983 reflects both the effect of El Chichón eruption and winter increase of aerosol concentration. On the other hand, the high aerosol concentration on July 21, 1985 reveals a regular seasonal variation having a remarkable winter maximum. The difference in the stratospheric aerosol concentration between the two winter measurements can be attributed to the aftereffect of El Chichón eruption.

An extensive aerosol layer was also observed in the measurement on October 8, 1985. The concentration was about three times higher than that usually appeared during the low volcanic period in the summer season. The high aerosol concentration cannot be attributed to the aftereffect of El Chichón eruption. The stratospheric temperature measured during the flight of October 1985 was about 5–10 degrees colder than that of October 1983. The high aerosol concentration of October 1985 could be attributed to the aerosol formation in the cold spring season.

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